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APRIL
1981

april pools fuels tools rules

DRIVER

april

Boy, do I feel lonely. Here I am with a fool-proof method to save money and gasoline, and nobody pays any attention to me.

You see, I am the originator of the idea of ridesharing. I invented car and van pooling, and I made them work in my homeland, the Netherlands. We don't have much space, and we can't afford to use a lot of it for parking lots and highways. I came to this country nearly two years ago, to attempt to promote to Americans the idea of ridesharing. I had some initial success, when the Americans were worried about the rapidly rising cost of gasoline, but it didn't last. Gradually, the Americans dropped out of their car pools and went back to driving alone to work.

Nobody is paying any attention to the wisdom, or the potential savings, of ridesharing. Listen to this quote: ". . . four people who live near each other driving four cars to the same destination to start work at the same time makes less sense than ever. There are more cars than there were in 1973 so driving in rush hour is anything but pleasant. Gas costs much more — you were paying 30 cents a gallon in 1973; now it's 75 or more."

A successful car pool must have a regular schedule of when, and in what order, the riders are to be picked up. It is the responsibility of the driver to be on time at each home, and it is the responsibility of each rider to be ready, so the pool won't have to wait.

Readers of this magazine might recognize that statement. It was made in DRIVER just two years ago ("Cooperative Conservation," April 1979 DRIVER). The statement is still true, except that you can double the final figure — by the time you read this you may be paying $1.50 for a gallon of gasoline.

And here I am, still trying to convince people to share their rides. It doesn't make any sense to me. If pooling was a good idea when gas was 75¢ a gallon, it must be twice as good an idea at $1.50. Yet, how many people regularly rideshare?

Oh, I realize that car pools and van pools are as popular now as small cars were 20 or 25 years ago. Back then, who wanted a subcompact?

pools

Ridesharing — the neglected money saver

by Dr. CORNELIUS VAN POOL
Special to DRIVER Magazine

The riders in this pool are picked up at home and delivered right to the door of their office building. They arrive rested and ready for the day's work. The driver will get the same treatment next week, when one of the others drives.

People wanted the size, speed and power of the large cars. Gradually, however, people began to see that economy was more desirable. The small cars' time had come.

Today, who wants to car pool? They'd rather drive around by themselves; perhaps it's a desire for status. But they will soon see that driving alone makes very little sense, economically or any other way.

I would like to speed up the process and convince *you* that ridesharing is a good idea. So follow me as I give the economy and safety reasons for pooling. Pay attention; you'll find this very interesting.

Pooling saves money: A good place to begin saving money is in the area where you spend most of it. With reference to your gasoline bill, you spend most of it in getting to and from work. The Federal Highway Administration says that about 42 percent of an American's driving is devoted to earning a living. That's nearly half. If you could decrease the amount you spend on almost half your driving, wouldn't you be wise to do so?

One way to do that would be to get a more economical car, and many people are doing that. But a cheaper way is to share the cost with others. It costs the same amount to drive your '78 Chevy (or whatever) to work no matter how many people are in it. By sharing the ride — and the cost — with others, you could cut your expense by one half, or even more.

How much money pooling will save you depends on several factors. These are the number of people in the pool, the distance driven, the cost of the gas and the mileage your car gets. The only one you can control is the number of people in the pool.

To make it a little clearer, let's take a hypothetical example: You drive 10 miles to work each way, for a total of 20 miles a day. Your car gets 20 miles to the gallon. If gasoline is selling at $1.40 a gallon, you spend $1.40 each day to get yourself to work. That

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Secretary of the Air Force

Lt Gen HOWARD W. LEAF
The Inspector General, USAF

Maj Gen HARRY FALLS, Jr.
Commander
Air Force Inspection and Safety Center

Brig Gen LELAND K. LUKENS
Director
Aerospace Safety USAF

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Dr. FRANCIS S. McGLADE
Director of Safety
United States Army

RADM W. B. WARWICK
Commander
Naval Safety Center

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COL. WARREN L. BUSCH
Chief, Safety Education Division

VIRGINIA HENDRIX
Editor

TSgt RON LATHROP
Technical Editor

JERI ROOD
Feature Editor

ALICE MILKEY
Editorial Assistant

DON KELLEHER
Art Director

LORRAINE HAMBLEN
Staff Artist

CLIFF MUNKACSY
Staff Photographer

THE EDITOR SPEAKS

DOUBLE CLUTCH

NEGLECTING MAINTENANCE

As the average age of the cars on our roads gets older and older, wouldn't you think the car maintenance business would be booming? Well, it isn't.

The Automotive Service Industry Association in Chicago says that until now car repair has been considered a recession-free industry. In fact, during the recession in the early '70s garages and auto parts houses enjoyed a real boom. But not this time. During the past 18 months, people have been putting off normal maintenance, and most repair work is of the emergency type. When the car breaks down and won't run any more, they take it in and get it fixed. But things like spring tune-ups and checkups, which require a variety of parts and which the service industry has long promoted, have fallen off.

Champion Spark Plug Co. does monthly surveys of 2,000 motorists and, using modern statistical methods, comes up with a profile of the condition of the nation's entire car fleet. Champion believes that more than five million cars did not get the tuneups in 1980 that they had in previous years. The company's declining sales figures bear that out.

Mechanics report seeing more cars that are not really roadworthy. A mechanic at a garage in the mid-west told a reporter that wheels are falling off cars on the nearby interstate at a rate of three a week. The ball joints just snap off and break.

If you're beginning to suspect a message in this column, here it is: Don't try to save money by ignoring brake problems or bald tires or a groaning front end. Such problems only get worse. Make a habit of checking fluid levels, tire inflation, hose and belt condition, and other simple items each time you fill your gas tank. That way, little problems won't turn into big ones.

If you've never done the simple things for yourself and don't know how, send us a postcard with your name, military rank (any Service) and address and we'll send you a reprint that explains it all clearly. It's called "Self-Service Gas Up 'n Go" and appeared in DRIVER several years ago. The prices mentioned for things like oil, gas, and trans fluid may bring a tear to your eye, but the how-to info is good as ever.

april pools

continued

A car pool is an economical way to commute, no matter what you drive. This full-size car may get only 12 miles to the gallon around town, but with five people inside it gets 60 *person* miles to the gallon (12x5=60). That's much more economical than five people each driving 30-mpg cars.

works out to at least $28 a month (and that's just for commuting to work; it doesn't include the other driving you do). If you had a rider who paid half, you'd pay only $14 for the gas. If you had two riders, you'd each pay $9.33; and if you had three riders, each would pay $7 a month for the gas. The more riders, the less cost to each person.

The costs become more important when you consider more than just the gasoline. I took a look at a pamphlet of the American Automobile Association (AAA) called "Your Driving Costs." (You might be interested in obtaining one if you're an AAA member because it tells you how to figure the costs.) The pamphlet gives a "national average" cost, based on "a 1980 Chevrolet, 6-cylinder (229 cu. in.) Malibu Classic 4-door sedan with standard accessories, automatic transmission, power steering, power disc brakes and radio, driven up to 15,000 miles per year. Gasoline costs are based on $1.22 per gallon. Insurance is based on a pleasure use category where the vehicle is driven less than 10 miles to work and there is no youthful operator."

With this as a basis, they calculated the cost of gas, tires and maintenance (variable costs) at 7.62 cents per mile. Other costs, including insurance, license, registration, taxes, depreciation and finance charges (fixed costs), brought the total to 21.2 cents per mile at 15,000 miles per year. They said, "While some fixed costs are the same even if the car remains parked in the garage, the more you drive the less the per-mile cost will be. Conversely, a reduction in mileage will raise the per-mile cost." So at 10,000 miles, the cost would be 28 cents per mile.

Let's use 28 cents. That makes the cost of commuting to work (as in my 20-mile example above) $5.60 a day. That's over $112 a month. Nothing to sneeze at.

Recently, the Hertz Corporation did a 20-city study of the cost of operating a car in America. Its results were even more grim. For the cities they studied, Hertz found that the average cost of running a subcompact car was 40.3 cents per mile.

That's a *subcompact*. The other figures were 44.5 cents for "small mid-range," 46.6 cents for intermediates and 51 cents for full-size cars. (This was based on a car driven 10,000 miles a year, and traded after three years.)

Plugging the figure for a subcompact into that 20-mile commuting example yields $8.06 per day, $40.30 per week and *$161.20 per month*. Just to get to work.

Let me stop here and say that I am not advancing these figures as absolute. I realize they are, at best, esti-

continued

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mates. I also realize that the Hertz and the AAA figures are probably not comparable. But my point in bringing them up is simply to illustrate that it takes money — a lot of money — to operate an automobile. Can you really afford to drive alone to work?

Pooling is safe: Okay, so those are the economical reasons for ridesharing. What about the safety reasons I mentioned? You might not think there are safety aspects to pooling, but there are.

One is simply that there are fewer cars on the road. With a four-person car pool, there are three cars left at home. One figure I've heard is that there are 50 million cars commuting every day, with an average of 1.4 persons in each car. If there were just *one* more person in each car, there would be 15 million fewer cars on the road. Another estimate is that one out of five cars would be left at home if there were just one more person in each car.

Whatever figure you want to use, that's a lot fewer cars. And fewer cars mean less congestion, which in turn means more space between cars and less likelihood of accidents.

Fewer cars would also make drivers less uptight about driving. I don't know anyone who likes driving in heavy traffic; some people tolerate it and some are frightened of it.

Highways in some large cities have special lanes set aside for car pools. This would also get poolers out of the worst of the traffic.

The riders themselves are a safety feature you might not consider. They often cause the driver to handle his car more cautiously, simply by their presence. After all, he is responsible for their well-being. And extra sets of eyes can help spot emergency situations that the driver alone might miss (see "The Passenger as Co-Pilot," August 1979 DRIVER).

Another advantage of the reduced congestion on the highways would be reduced pollution, which we would all like to see.

There are other assorted benefits. The riders in a pool get to leave their homes and get into climate-controlled vehicles already warmed (or cooled) to comfortable temperatures. The riders don't have to warm up the car or scrape it off in winter, except perhaps every fourth or fifth week when each has his turn to drive.

The riders also can relax on the way to their destination. They can read, catch up on some paperwork, or perhaps just sleep. If they're in the mood to talk, there's someone there to talk with. (Driving alone, you have to talk to yourself.) At work, employers often give preferred parking to car and van pools. At large installations, with long distances between the parking lots and work areas, this could cut down on the walking.

The poolers also use less gasoline, and put fewer miles on their individual cars, which makes them last longer. They may be able to get reduced insurance rates because the car is not used every day for commuting. They could even be able to get rid of a second car and thereby save even more.

There are also benefits for the employers. The employer gets workers who arrive fresh and ready to start their jobs, because they didn't have to fight the traffic. The workers are very punctual, because they arrive at the same time and leave at the same time each day. An employee who has a habit of arriving late will conform to the schedule of the others and start arriving on time.

Van Pools: Van pooling is a more involved form of ridesharing, but it has its own special attractions. Many companies have started van pooling programs, and there is an active and successful van pool at Offutt Air Force Base in Omaha, Nebraska.

A van pool is simply a car pool that uses roomy, comfortable vans to transport the riders to work. Did I say "simply?" It can be simple or it can be more complicated than that.

First, there must be a van available for the pooling. It is possible an employee could have a suitable van for carrying others to work. If so, he could organize a van pool and charge his riders enough to cover his expenses. More often, however, the

At work, employers offer benefits to their workers who rideshare. Often, they set aside close-in parking for the car and van pools, which makes pooling even more convenient.

A van pool is a pleasant way to get to work. The drive allows the riders to talk and get acquainted. Sometimes van pool riders become tightly-knit social groups.

van pool must be organized literally from the ground up. An individual can purchase a van for this purpose and handle all the details himself.

Another idea is the company-owned van. The employer buys a van for transporting workers. The company chooses a driver, and it pays all the costs and does the administrative work, charging the riders a fee. The company benefits from the fact that the van pool is less expensive than the costs of providing the employees with free parking, and the company may also be able to receive a tax break. As I mentioned, the company also receives benefits from rested and relaxed employees, and from good employee and public relations.

Still another idea is the third party who provides van pool service to the company. The van pool service may operate for profit, or it may be a non-profit group. The service leases the vans to the people for their use. Sometimes the employer might foot part of the bill for the van pool service. This is the most expensive method of setting up a van pool.

The van pool at Offutt AFB is a privately-owned van pool. But the organizers of the pool did something interesting in their planning — they set themselves up as a private corporation. This provides stability to the group, with the military members being transferred every few years, and also some legal protection. The corporation members' fees for riding are used to purchase or lease the vans, and to cover the administrative costs.

The pool presently has 14 vans running, carrying 220 people, including drivers. It was begun in 1977 with just three vans, so the program has really grown. (For more information on this particular operation, see "Van pool, Anyone?" July 1979 DRIVER.)

The set up: I hope the preceding facts have convinced you that ridesharing is for you. But just agreeing that it's a good idea isn't enough; you have to know how to get the program started.

Car pools can be very simple to arrange. If you know some neighbors who work where you do, you can contact them with the idea and get started tomorrow. However, today many people don't know who their neighbors are, or know only a very few of them.

One method that has been used is simply to put an item on the bulletin board at work announcing your interest in setting up a car pool. Other poolers should live near you, have compatible work schedules and should be reliable. An even better idea, though, is to get the active interest and assistance of the commanding officer at your installation.

If your commander takes an interest, he can bring in the people on his staff who can smooth the way. These are the transportation people, judge advocate, information (for publicity) and others, including data automation.

Many companies and military bases have generated a listing of possible ridesharers by using computers. All people on the installation are given a survey sheet to fill out, asking them whether they are interested in pooling rides to work. If they express interest, they give their address and phone. The results are fed into a computer, which then provides listings of persons who live close to each of the respondents. The actual set-up of the car pool is left to the individuals.

For those organizations that do not have access to a computer that can be used to generate a carpool listing, there are nonprofit groups around the country that are set up to help you, like Southern California's Commuter Computer. Check with your local auto club to see if there is a similar group in your area.

In the case of van pools, the support of the commander and his staff is imperative. The amount of details that must be worked out demand the appointment of a full-time van pool coordinator to get the program started. This is what was done at Offutt AFB. However, after the program is underway, it can be run without taking up much of the coordinator's time.

By the way, Offutt's present ridesharing monitor, Sgt Keith Callaway, invites interested bases to contact him at AUTOVON 271-3571, or (402) 294-3571, with any questions about their operation.

Arguments: Now I want to attack some of the objections I hear from people about ridesharing. Read on; your own may be here.

continued

■ **"There isn't anyone who lives near me to pool with."**

Do you know this, or do you just suspect it? You may be wrong; there may be someone right around the corner who wants to pool a ride. The only way to know for sure is to fill out the ridesharing survey, or advertise your desire to start a car pool.

■ **"I don't want to give up some of my freedom."**

You may consider driving to work alone a "freedom," but I just call it a needless expense. How about the freedom you give up when you don't have the money to do the things you enjoy? The more money you save by sharing the cost of commuting, the more money you have to spend on your hobbies. If you like owning your gas-guzzling full-size or performance car, carpooling can help you afford to keep it.

■ **"I can't stand other people's habits."**

I don't think anyone is so obnoxious that he can't be brought into line. If he really wants to belong to a car pool and save money, he will conform to reasonable rules. I'll talk about setting up rules a little later.

■ **"I have odd working hours."**

Okay, if you do, maybe pooling isn't for you. But are your hours always irregular, or just for one or two days a week? You can pool with others on the days when your schedule permits and then drive your car on the odd days. You'll still save enough money to make it worthwhile.

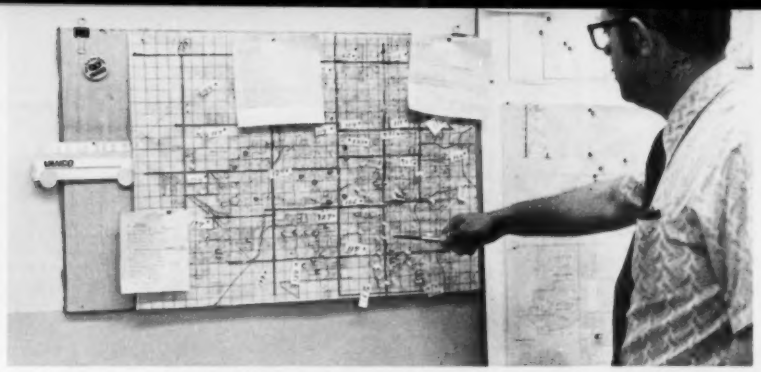
■ **"I need my car during the day."**

Again, is that every day or just some days? You can make arrangements to have your car when you need it, and ride with the others when you don't need it.

Pool cues: I want to finish up with a few tips on making the car or van pool as attractive a program as possible. Usually, the economic needs of the riders will encourage them to get into a pool, but they will leave the pool if certain rules are not followed.

■ First, have a seat for everyone in the carpool. If you have six people in the pool and one person has a car that will seat only four comfortably, that person's car cannot be used in the pool. In such a case, you would have to make adjustments in the finances to allow for the nondriver, perhaps having him pay more. Never overload a car or van. It is not only uncomfortable, it is also unsafe.

■ Have a schedule of when (and in what order) each rider is to be picked up and stick to it. Don't honk to alert them you're there; the neighbors might be sleeping. Wait for an agreed-upon amount of time and then go on. The schedule should allow enough time for difficulties that might delay the pool from arriving at work.



(left)
One key to a good ridesharing program is matching up the members of the car or van pool. By using a detailed grid map, the coordinator of the pool can organize a group of people who live near each other, and who have work schedules that coincide.

(below)
The abundance of one-occupant cars creates congestion not only on the streets but also at the gates of your installation. An increase in ridesharing would relieve this problem.

The Offutt Van Pool, Inc., was begun in 1977 with three vans. By 1978, it had eight and today it has 14. The riders are members of the corporation, whose rider fees pay for the vans and their maintenance, and for the administration of the pool.

continued

There is nothing cramped about the space inside a van. Vans can be purchased that hold up to 15 people comfortably.

■ Have a schedule for when each person drives. You can rotate drivers every day, week or month, but I suggest weekly rotation because it creates less confusion than changing every day, and it causes less stress on the driver than changing by the month.

■ Set up a chain of communication, in case of emergencies like illness or car breakdown. It is best to follow the morning pick-up schedule. If one person is ill, he should call the driver and also the next person on the list, who will then get ready earlier. That person will call the next one on the list, and so on.

■ Before the first ridesharing, agree on some basic rules of behavior. This will forestall any arguments. Some things to consider are smoking, conversation, where each pooler sits, use of air conditioner and heater, and choice of radio stations. The only way to find out if there are objections to anything is to discuss these matters beforehand.

■ Make an agreement beforehand on how expenses are to be handled. You might split up total expenses for each trip by the number of poolers, or you might want to avoid the arithmetic by having the driver of each car pay for all expenses when he drives. If you have payments, set them up for no more often than once a week; it's easier that way.

■ It should be the driver's responsibility to make sure the van (or his own car, for car pools) is clean, comfortable and serviced. Also, the riders should comply with any reasonable wishes of the car's driver; for instance, if he doesn't want smoking in his car, the riders should obey.

■ Make sure beforehand about the insurance coverage necessary for a car or van pool. Liability may be sufficient, but you should check to make sure. Your insurance company or the staff judge advocate can help.

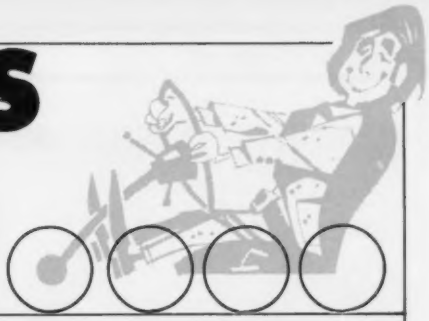
■ Do not make side trips when commuting. These are annoying to the other poolers, and could lead to arguments and the breakup of the pool.

■ Expect changes in the pool. If someone changes jobs or work schedules, or if he moves, he might have to drop out. Be prepared to look for someone else to join up.

■ Drive safely, because you are responsible for the safety of all in the vehicle. Never speed or drive carelessly, and don't allow the other drivers to do it either. The driver should make sure all riders buckle their seatbelts, and he should set the example by buckling up himself.

So that's my word on ridesharing. Please look into the benefits of pooling your rides to work with others. I claim rights to the idea of ridesharing because I invented it, but I'm not making any money from it. The only one who will gain financially from pooling is *you*.

APRIL RULES



A few tips on bicycling for the 2-wheelers and their 4-wheeling friends

There are plenty of reflectors on this bike and Cheryl is wearing a white sweater, so she's okay for night riding, right? No. There is no headlight on the bike. Check with your local police to find out what they will and will not allow.

Bicycles and cars are very different vehicles, but they must share the same roads. Therefore, their operators must follow the same rules of the road. We've assembled a number of assorted tips on bicycling for you readers, to promote more awareness about what is expected of you, whether you're in the car or on the bike. There are both "right way" and "wrong way" tips here, so watch yourself!

Before you go riding anywhere, there are some maintenance checks you should make. Such things as nuts and bolts, condition of the tires and spokes, and adjustment of the brakes should be looked at carefully.

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Your bike should have reflectors, as required by local laws. This one has reflectors on the front and back, and on each wheel and pedal.

Many people think you should ride a bike on the left, facing traffic, the way pedestrians walk when there's no sidewalk. They think they're safer if they can see the traffic. But this is not only *un*safe, it's also illegal.

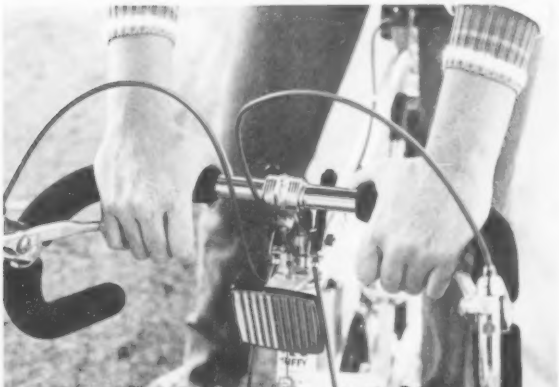
You must also *be seen by the drivers.* A driver making a right turn here might not see Cheryl until he has printed "Goodrich" all over her and her 10-speed.

And when she makes her own right turn, she has to cross several lanes of traffic to do so. *Not* a good idea.

You should ride with traffic, on the right. That way you won't confuse the drivers, and you'll be safer.

Another thing: Ride close to the right edge of the street, out of the car-traveled portion of the road. But watch for rocks and rubbish by the side of the road, and for things like drainage gratings.

Another hazard to be alert for is drivers who don't watch when they open their doors. Need we remind you drivers to check your mirrors?



These levers are called the "safety levers." Now that we've told you that, forget their existence.

(right)
Use the regular brake levers at all times. These are the only ones that will allow you to apply full braking pressure, which you'll need in emergency stops.

continued

continued

(left) The only time your hands should leave the handlebars while you're riding is when you signal. This is the proper hand signal for a right turn. **(middle) This is the way** to signal for a left turn. **(right) This is the signal** for slowing or stopping. Automobile drivers should know these signals, not only so they will know what the bikers are doing, but also so they'll know how to signal if the car's turn indicators or brake lights fail. That's right; the signals are the same.

Bar none, the most dangerous place for a bicycle is the intersection. Part of the problem is that the bicyclists often fail to obey the signs and signals. Drivers, be on the lookout for cyclists with an apparent death wish.

Riding on the right makes the left turn a little tricky, especially at major intersections. Perhaps the best way to handle a busy intersection is to walk the bike across, using the pedestrian crosswalk . . .

And then turn at the corner and cross the other street, just the way a pedestrian would do it. Be careful of impatient or inattentive drivers. (Again, drivers, watch for bikers at intersections. They make lousy hood ornaments.)

What's she smiling about? The sidewalk is for foot traffic, not for bicyclists.

Likewise, it isn't made for parking your bike. Not only is this a hazard to people trying to pass, it is also a good way to get your bike ripped off. Try the bike rack, with a sturdy chain.

Some streets have painted bike lanes, designed to give the bicyclists a safer place to ride. They are indeed safer, but they are not magic, so be alert. Don't get the idea the cars can't hit you, just because you're in a bike lane. Watch out, especially on narrower roads and where the bike lane's lines are faded.

REMOVING HELMETS from accident victims

One rescuer applies inline traction (pull) by placing his or her hands on each side of the helmet with the fingers on the victim's jaw. This position prevents slippage if the strap is loose. Pull only enough to keep the head and neck in line. Too much pull may cause damage.

The second rescuer cuts or loosens the strap while the first maintains the inline traction.

The second rescuer places one hand on the jaw at the angle, the thumb on one side, the long and index fingers on the other. With his other hand, he applies pressure from the back of the head. This maneuver transfers the in-line traction responsibility to the second rescuer.

The method for helmet removal shown here has been publicized by the Committee on Trauma of the American College of Surgeons for use by pre-hospital-care technicians and examining physicians. Because a helmet protects the face and head from injuries, rescuers and people providing the first medical attention may assume that an unconscious rider is not seriously hurt when quite the opposite is true. Scratches on the helmet may be the only clue to a fracture of the spine in the neck area.

Inappropriate actions in removing the helmet can damage the cervical cord when the overlying bony structure has been fractured.

Incidentally, helmets do not cause neck injuries. Studies show a slight decrease in the number of helmeted riders with neck injuries when compared with nonhelmeted riders, although the difference is so small as to be statistically insignificant.

This information is given primarily for ambulance drivers, emergency room personnel and other trained people. If you, as a motorist or cyclist, come to the scene of a traffic accident, the most helpful thing you can do is call an ambulance. Don't move unconscious or injured victims unless they are in danger from fire or could be struck by on-coming traffic. In the case of a motorcycle accident, you can raise the face shield of a helmeted victim but remember you *may* do more harm than good if you remove the helmet.

The full-face-coverage helmet is more difficult to remove than the helmet used for our pictures, but the same removal techniques apply.

The rescuer at the top removes the helmet. Three factors should be kept in mind:

- The helmet is egg-shaped, and therefore must be expanded laterally (sideways) to clear the ears.
- If the helmet provides full facial coverage, glasses must be removed first.
- If the helmet provides full facial coverage, the nose will get in the way. To clear the nose, the helmet must be tilted backward and raised over it.

Throughout the removal process, the second rescuer maintains inline traction (pull) from below in order to prevent head tilt.

After the helmet has been removed, the rescuer at the top replaces his hands on either side of the victim's head with his palms over the ears.

Inline traction is maintained from above until a backboard is in place.

tteecc!h!
DOUBLE TECH
Q A
With TSgt RON LATHROP

MISCELLANEOUS MUMBLINGS: Occasionally an article in DRIVER Magazine will bring a small flood of mail such as when Dr. Harry Hurt told us that tattoos were indicative of risk-taking personalities. But nothing printed in DRIVER's recent history touched so many open nerves as the December 1980 answer about the search for premium gasoline.

Some of the letters received were down right abusive toward DRIVER's technical editor and promoted the following outcry:

THE BACKYARD MECHANIC'S LAW: If you are right half of the time you're lucky.

THE BACKYARD MECHANIC'S COROLLARY: If you are right 51 percent of the time you're a genius.

THE BACKYARD MECHANIC'S RULE: If you are right 49 percent of the time you're an idiot.

DOUBLE TECH'S FORMULA: One correct answer in print equals 10 critical letters in the mail.

READER'S COMMENT: Aviation fuel can be used in an off-road vehicle ONLY. Since you don't pay road use taxes on this type of fuel, it cannot be used in a vehicle run on publicly-maintained highways.

REPLY: As was pointed out in the February 1981 DRIVER, when the distributor sells aviation fuel to the airport, the road use tax is included in the price. The airport then applies to the state for a refund on that portion that was pumped into aircraft.

COMMENT: You will find that a federal airways use tax (as well as state and federal sales tax) is included in the price the petroleum company is charging the distributors and dealers for aviation fuel. So you are paying a tax for which you are receiving no benefit. Besides, economically, aviation fuel (100/130 octane) is selling for 40 cents per gallon more than auto fuel locally.

REPLY: When you are having trouble finding gasoline that your engine will run on, price is no object.

COMMENT: First, use of aviation gasoline in civilian automobiles is illegal due to the difference in federal and state taxes applied to each. Second, no reputable dealer in aviation gasoline will pump aviation gasoline into an automobile. Third, no reputable dealer will pump aviation gasoline into gas cans or other containers.

REPLY: As the February 1981 DRIVER pointed out, it is not illegal, it is just that the dealers won't be bothered with the paperwork.

COMMENT: You indicated that aviation gasoline would evaporate more quickly than automobile-blended gasoline. Not so. Avgas of all grades has about half the vapor pressure of mogas. It is made this way so that it won't boil away so readily at high altitudes. That's why it is so hard to get it to evaporate at low altitudes during engine start, and that's the big problem you'd have with it in your car. Another difficulty worth considering is that the only 100 octane aviation gasoline available for private purchase these days is the so-called low-lead variety, which has a much higher aromatic content than other gasolines, and can cause rapid deterioration of gaskets and seals in the fuel system. Don't get me wrong; I do this myself when the occasion suits. But one needs to know what the consequences might be.

REPLY: You're right, I got avgas and mogas turned around on evaporation, which leads to starting problems. And you're also correct about the blending of additives in avgas versus mogas. The bottom line for all readers should be: use a fuel that is blended only for what you are using and doing. If you're driving a car, use automotive fuel; if you're flying, use avgas. But, if push comes to shove, there are some alternatives.

COMMENT: I might point out that even though vehicles may be high performance, that doesn't mean they are gas guzzlers. My high-performance car gets 25-plus mpg on the highway and 21-22 kicking around town. My motorcycle also runs on high octane fuel and delivers excellent mileage. If gasohol is available, try it. My car and bike both perform well on gasohol and so far have had no bad side effects.

REPLY: As was pointed out in the February 1981 DRIVER, gasohol does have a higher octane rating than unleaded fuel. This doesn't always mean increased performance. But you'll never know until you give it a try. You will also see that the editor always puts a note on the Double Tech column that tells readers to include all available information when writing questions. Believe me, the vehicle in question in the December 1980 Double Tech was a gas guzzler.

COMMENT: Many older high-compression cars, such as mine, have lost sufficient compression that they run well on regular gas. In fact, mine not only runs well — it starts more quickly, also.

REPLY: You're lucky. The December writer's car didn't run well on regular. And as a matter of fact, many cars that once ran on regu-

lar now require a higher octane fuel because combustion chamber deposits have built up, increasing the compression ratio. Remember in the days past when your car would continue running after you shut off the ignition? That was usually caused by these deposits that had to be burned out or scraped off.

COMMENT: Detuning high-performance engines is one possibility. Thicker head gaskets, shorter pistons or crankshaft stroke, or machining the head to increase the size of the combustion chamber can all reduce compression. Lower compression, along with readjusted valve and ignition timing, can help any engine cope with lower octane fuel. Admittedly, these modifications will reduce power somewhat, but many muscle car engines had more power than you could use on the street anyhow. Besides, if you compare them to today's engines, tuned to run on a mixture of lawnmower gas and recycled exhaust fumes, who's gonna notice?

REPLY: Here's what to try in order: Retard the specified ignition timing two degrees. Don't exceed two degrees or you'll chance overheating, burning the valves and reducing what economy and power the engine has. Next, go to a thicker head gasket to reduce the compression ratio. After that, buy shorter pistons. If they're not available, have stock ones machined about .030. Changing the crank or machining the combustion chambers is usually too expensive.

COMMENT: Water-alcohol injection is another possibility. Used in aircraft engines for years to reduce detonation at high-power settings, it's being used more and more in automobile engines — especially those with turbo-chargers — and may someday be standard equipment.

REPLY: You're right — as was pointed out in the February '81 DRIVER. But remember this formula when buying any equipment to improve fuel economy: the cost times the new miles-per-gallon times the original mpg equals the number of miles it will take to pay off the costs.

COMMENT: I changed the pistons in my 1968 muscle car four years ago, lowering the compression from 10.5 to one down to 9:1. The money saved between purchasing hi-test and regular has already paid for the $200 I spent on quality parts — rings, pistons, gaskets and shop work (press fitting new pistons). And the engine is still rated at better than 300 hp. This is more than enough to conquer all these late model bombers, even with turbos. And this detuned muscle car gets a respectable 14-plus mpg about town and 17-18 mpg on long highway travels, pushing 3.9 rear gears. All this and heaven, too.

REPLY: DRIVER Magazine is a safety publication and none of the staff can figure out why you have to "conquer" all the other vehicles on the street. Secondly, I don't know anybody who thinks that 14 mpg is "respectable." True, gas mileage is in the pocket (or is it "out of the pocket?") of the beholder. And at better than $1.50 per gallon, 14 mpg takes it out of the pocket faster than most of us can earn it.

COMMENT: As a matter of basic economics, an older gashog, in sound condition, is far more economical for the owner than the premature purchase of an expensive "economy" car. On a larger scale, your implication that selling or trading-in such a car would get it off the road is ill-founded. By and large, such cars are under-valued transportation, soon purchased and driven by others.

REPLY: Of course you are right about gashogs being undervalued transportation. But if an individual feels "stuck" then the vehicle should be sold. Whether we agree with them or not, feelings have to be dealt with.

COMMENT: Not all premium gasoline-using cars are muscle cars. Even if your December writer's car was a muscle car, it probably doesn't guzzle any more gasoline than the monster motor homes and RVs we see congesting our highways and, while I wouldn't get off rumbling around town behind a full-house 427 Chevy or the like, I would certainly respect the right of others to do so if they want to.

REPLY: Second things first: People who get off cruising the local drive-in hamburger joint with their rat-engine pony car don't complain about being "stuck" with a car that runs on premium. As for motor homes and RVs — back that 52 hp, 35 mpg, premium-burner that you wrote about in the rest of your letter off their bumper. First-off, most of them are used only on occasional weekends, and then only to get a large group of people to a specific location where they stay — not bothering other people — for some length of time. If you figure out how many passenger-miles-per gallon they deliver, you'll be shocked, especially when compared to some of the so-called "economy" two-seaters. Besides, because they are "camping out" during their weekend or summer vacation, they are actually saving energy in the long run. They are not home using all the lights and TVs, heating the swimming pool or allowing the kids to leave the doors open while the air conditioner labors. Now, if one person is driving a motorhome back and forth to work

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without any riders, you've got an RV problem of a different color.

COMMENT: It's obvious the person who answers Double Tech questions has never owned one of the "muscle" cars and apparently doesn't enjoy their existence. There are many of us that do. We own them, keep them immaculate, and drive them daily, enduring pinging, door bangers, and other various road hazards.

REPLY: But you don't write letters complaining about being "stuck" with them. The people who do write those letters need to be told to "dump" their machines so people like you can buy them — at dirt cheap prices.

COMMENT: Your phrase of being "stuck" with a car that runs only on high octane fuel is most ill-worded. I for one can take personal offense to that phrase. I also own such a car, and I would never think of having any other type of car. I will never agree nor will you see the day in my opinion that the "muscle car" will ever be a car that somebody will get "stuck" with. These cars are a rare breed and from reading and past experience with such cars, they appreciate in value, and not depreciate as your comments would have the public believe.

REPLY: As the editor always tells me: "Be nice!" Even if I didn't agree with the writer's feelings of being "stuck," that feeling is very real to the writer and has to be addressed as being real. Generally, "muscle cars" appreciate in value if you have the time to wait for that one buyer who is willing to pay the price. Pseudo-classic buying and selling is an art in itself.

COMMENT: I would like to take exception to your flip answer to a real problem — the scarcity of leaded premium fuel. Do you know a source of reliable information on how to provide the benefits of leaded fuel for these engines so as to avoid valve damage from using unleaded fuel?

REPLY: Before modern technology solved some problems, lead provided a desired lubricating coating for valves. Note that the valves only needed a coating of lead-compound. In 1971 when unleaded and low-lead fuels became widely available, engines began having compression ratios to match poorer fuels. That year, fuel tanks of cars leaving the factories were filled with leaded fuel. That one tankful provided all the lead coating that was necessary for long valve life. So you can see that your valves should already have all the lead coating they need. If you have to replace the valves, the materials used in the newer valves should not require the same lead coating to survive in the open and closed explosive environment of the combustion chamber.

COMMENT: As for muscle cars burning too much fuel, I disagree. One hundred gallons of crude oil will produce 95.24 gallons of unleaded gas, but only 87.8 gallons of unleaded gas. This 8.5 percent difference may help explain the approximate 8 percent difference in price at the pumps. Once the gas is in the car, an engine with a high compression ratio will burn the gas more efficiently. If this nation is to save gas we should be replacing low compression ratio, no-lead engines with high compression ratio engines using leaded gas, not hastening their demise.

REPLY: As was noted in the February Double Tech, octane numbers posted on unleaded pumps went up during the recent fuel shortage because the octane-raising additive in unleaded gasoline was increased so that more gallons of gasoline could be produced from each barrel of crude. When comparing leaded to unleaded, you must compare similar octanes. The difference is small.

Have you ever heard the comment "get the lead out?" With today's technology the mileage delivered by unleaded-gasoline-burning cars more than makes up the eight percent difference you quote. In fact, 1980 cars get 51 percent better economy on unleaded fuel than did their 1974 counterparts (see March 1981 DRIVER).

Higher compression ratios mean higher temperatures which produce greater amounts of nitrogen oxides. One short breath, or even a simple look at any major city will show you the results of unburned hydrocarbons, carbon monoxide and oxides of nitrogen flowing freely from automobile exhausts — SMOG!!

Also, the lead alkyl deposits left from leaded-fuels increase the amount of unburned hydrocarbons and carbon monoxide an engine exhausts as it gets older.

Lead also fouls spark plugs and contaminates oil. That's why today's cars go farther between tune-ups and oil changes. The oil changes must also be included when you figure how far a gallon of crude can be stretched. And don't count out the dent in your pocketbook made by each of those costly tune-ups.

THE LAST WORD: Even in their hey-day, less than three percent of all the cars in the world had more aristocratic appetites than the low-lead and non-leaded fuels of today can provide. I dearly love high-performance vehicles, but leaded fuel presents too high a price to pay today considering what our children would have to live with tomorrow.

EDITOR'S NOTE: Double Tech is a question and answer column in which DRIVER will attempt to make clear some of the cloudy issues in readers' minds. Unlike other automotive magazine Q&A columns, Double Tech doesn't deal with specific questions such as, "Why does my SOAB eat front brake disk pads like popcorn?" Instead Double Tech fields questions that are of general interest to the majority of our readers. However, when sending questions or comments to Double Tech be sure to include all available information because this will help in finding the correct solution. If you have a question you'd like an answer to, and you feel others could use the knowledge also, send it to:

Double Tech
DRIVER Magazine
HQ AFISC/SEDD
Norton AFB, CA 92409

April dual

TWO-UP MOTORCYCLING

To set the record straight from the start: There is no such thing as a motorcycle passenger. Second riders on motorcycles can be co-riders, co-pilots, navigators and safety officers, but never just passengers. Likewise, a solo-ridden motorcycle is not the same machine when ridden two-up.

Pardon the pun, but we are going to bounce around between the second rider and the machine. However, there is a pattern to our bouncing. A pattern established by the Motorcycle Safety Foundation.

And while we're on the subject of the Motorcycle Safety Foundation . . . no matter how much experience you have, if you haven't taken one of their courses or something similar, why not give them a try? The courses are always fun, but most of all they are life savers. And take the second rider along, too.

Second Riders become navigators and safety officers as heavy city traffic places many demands on the operator.

As you may have already guessed, you don't just grab a friend, hop on a two-wheeler and motor into the sunset as if you were starring in a commercial. Before you can even dream about two-up riding, your machine has to be capable of handling the load.

Every machine has a weight limit beyond which it is no longer safe to operate. This is the vehicle's gross vehicle weight (GVW) rating, which is the sum of its gross axle weight ratings. GVW is the total weight of the vehicle, operator, fuel and cargo, including the second-rider. To exceed the GVW is to invite disaster. Similarly, it is not wise to exceed gross axle weight ratings.

GVW is limited by the weakest component of the axle system, which consists of the tires, wheels, springs and axle. Tires are usually the weak link for motorcycles.

Basically, a tire is an air container with air supporting the load. Increase the quantity or pressure of the air in the tire, and more load can be supported. Increasing the tire pressure might require changing to a higher load range in the same size, while the quantity of air can be increased by providing a greater volume by changing to a larger size.

Here are some simple rules that should be followed regarding motorcycle tires:

- Never intermix tires. Standard size tires help you avoid handling problems.
- Maintain size relationships of front to rear tires.
- Don't exceed original tire size by more than a single size increment. There are limits because of the rim widths and fender clearances.

The tire equivalent chart on these pages may help you with your selection.

Perhaps the best explanation of how GVW works would be a couple of examples.

A typical 1,000-plus cc touring bike with fairing and a full load of fuel weighs 745 pounds. Plop on our 175-pound hero (including the weight of helmet, jacket, boots and gloves) and the machine is ready to roll at 920 pounds, with 580 pounds on the rear axle, 340 on the front.

The sports/hi-performance tires on this machine have a maximum load of 520 pounds front, 600 pounds rear inflated at 42 pounds per square inch

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(psi). That makes the machine's GVW 1,120 pounds (520 + 600). The GVW less the total weight of the machine and rider equals the load that could be carried. In this case, 1,120 - 920 = 200 pounds. But this 200-pound load must be placed so that no more than 20 pounds is on the rear wheel (the 600-pound axle load limit less the 580 pounds already placed there).

The same machine and rider with a set of touring tires inflated to 40 psi has front and rear load limits of 410 and 695 pounds for the GVW of 1,105 pounds. In this case, the maximum load would be 185 pounds (1,105-920), but 115 pounds (695-580) of this load could be carried by the rear axle.

Now if we take the same machine and put on an even larger set of tires we get front and rear gross axle weight ratings of 810 pounds each with 42 psi front, 40 psi rear. Now we can increase the load to 700 pounds (1,620-920), with 230 pounds (810-580) on the rear axle.

Yes, to be safe you would need scales for both the front and rear wheels to exactly determine gross axle loads versus gross axle weight ratings.

If you exceed these limits you are running the risk of tire failure because of overheating from the load. The machine is going to be unstable, the braking performance is going to fall way off, and you could even have structural failures!

A word to the wise: the chain is going to experience additional stress and wear when riding two-up. Keeping it well-lubricated and clean now becomes more of a *must* than ever.

If you ask somebody how to set up your machine for an additional rider, he might tell you to check your owner's manual. Be prepared for a surprise. The manual will probably read something like this:

"When carrying a second rider tire pressures will have to be increased and the springs will require additional pre-loading."

Not very specific, is it? The vagueness is understandable because each situation is going to be different and will require each operator to make his or her own value judgments. Value judgments made from bike feedback on the road (ride, handling, stability, etc.).

However, if you need a rough idea about pre-load settings try this: Climb aboard in your normal seating position with the second rider seated (feet on pegs). Steady the machine with your toes (it is off the stand) as you slowly sit down. If the shock compresses more than one to 1½ inches, the spring rate is too light. Now bounce up and down. The shock compression should be easy, while the rebound is notably slower. You'll want to have a fair amount of shock travel left in all these positions.

Check out the front shocks the same way.

OK, it's time to check out the second rider. Begin with the clothing.

On the open road the second rider can help with signaling.

TIRE EQUIVALENT CHART
Tire Size Designations

Metric Inch (100 Series) Size	Inch (90 & 85 Series) "Low Profile" Size	Alpha (90, 85 & 80 Series) Size	Numeric (100, 90 & 80 Series) Size
2.25	—	ME	—
2.50	—	MF	60
2.75	—	MG	75
3.00	3.60	MH	80
3.25	4.10	MJ	90
3.50	4.10	ML	90
3.75	—	MM	—
4.00	4.25/85	MN	100
4.25	—	MP	110
4.50	4.70	MR	—
—	—	MS	120
5.00	5.10	MT	130

Loose clothing problems such as shoe laces and pant legs are going to have to be solved before they become tangled in the chain or wheel spokes.

The second rider should be wearing the same protective gear as the operator: helmet, eye protection, heavy clothing, gloves and boots.

Now caution the second rider about contacting hot parts of the motorcycle such as the exhaust pipes and mufflers. Be sure to show exactly where all the hot parts are — your friend doesn't know your machine as well as you do.

The second rider always sits directly behind the operator, never side-saddle, and holds onto the operator's waist or hips lightly but securely. Second riders, no matter how affectionate, should not death-grip the operator — supporting the weight of two people becomes very hard on the operator's arms and back.

When accelerating (including starting from a stop), both the operator and second rider should lean forward slightly. Loss of steering from load shifting or, worse, a wheelie is no fun. When stopping or braking, the second rider should brace against the footpegs and lean back slightly to reduce the weight shift forward.

Yes, the second rider's feet are on the footpegs at all times.

Now we get to the classic two-up instructions: "Don't lean unless I do — you can actually steer the bike when you lean. Lean as I lean."

Actually, most solo riders don't lean at all. The bike leans and they lean with it. So, if an overhelpful second rider leans into the curve, the bike is going to suddenly start turning sharper than the operator wanted it to. Should the second rider lean the wrong way, the bike with two very frightened riders is going to go straight instead of turning.

So what's the second rider supposed to do? Become a co-pilot and sit erect behind the operator, relaxing enough to lean with the bike but taking no clues from the driver's body position. On right-hand turns, the co-pilot looks over the driver's right shoulder; on left-hand curves, he or she looks over the operator's left shoulder.

Co-pilot? Sure, the second rider should read the road ahead just as if he or she were the driver, getting ready for lane changes and emergency maneuvers. There's nothing like attempting an emergency move and having another helmet crack into yours. And in the city, the second rider has to become a navigator and safety officer, watching traffic situations and reading road signs because the heavy traffic is very demanding on the operator.

A word of caution. If this is the second rider's first trip (no matter how short) on a motorcycle, don't try to impress him or her with the machine's performance. All you are going to do is terrify the second rider. And when terrified, second riders have been known to do some pretty weird things.

Which brings up a point for second riders: Don't make any moves without telling the driver in advance. There's no reason to scare the operator — even if he or she tried to terrify you.

One last hint about getting things in order. Start the engine before the second rider mounts.

Is that all there is? No, but two-up riding is one of those team activities that is developed with experience. But please don't tackle it until you've honed your solo skills smooth.

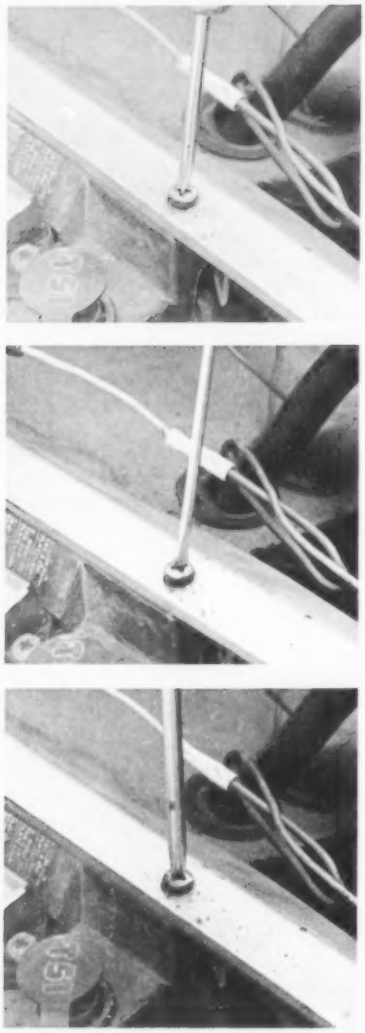
Protective gear for the second rider should be the same as for the driver: helmet, eye protection, heavy clothing, gloves and boots.

April Tools

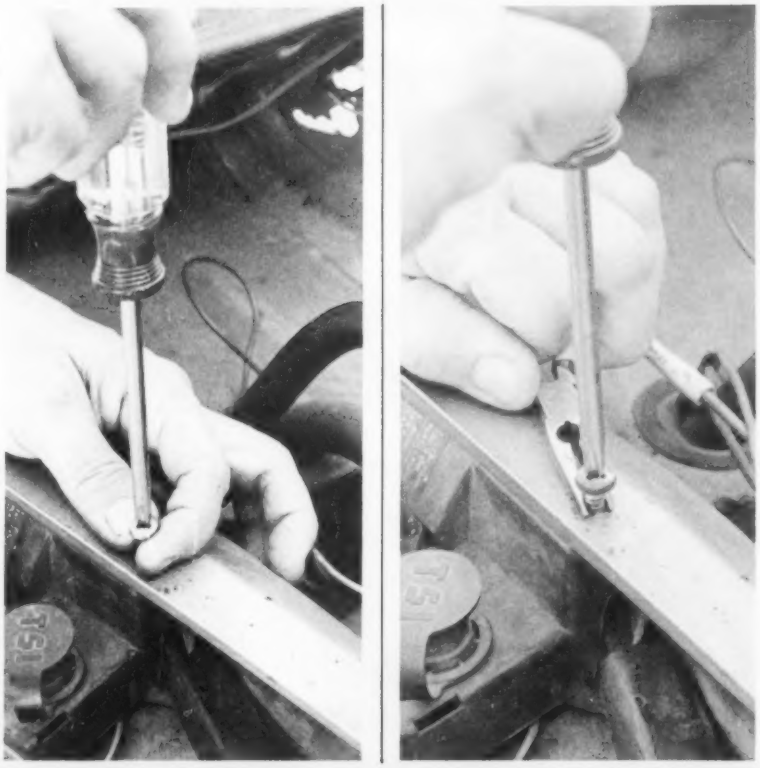
The Backyard and Back*ward* Mechanics share the same office because they both believe they are "*The* Backyard Mechanic." However, one look will tell you which is which.

The Back*ward* Mechanic is the one that looks like a refugee from a Brownie Scout first-aid practice session. He isn't accident prone, but he does have a major shortcoming: Tools. He never uses the right tool for the job at hand, and when he does select the proper tool, he uses it incorrectly. You see, he's not unlucky; he just lacks certain skills — the skills of tool selection and use.

The screwdriver is a good example. Although it is one of the most used tools, it has only one purpose.



Screwdrivers are easy to use. Just find the one with the blade that fits the screw slot as close as possible. As with Goldielocks and the three bears, (top) is too small, (middle) is the wrong type and (bottom) is just right.



Hands must never be below the tip of a screwdriver blade. To steady a screw, use pliers (right) not fingers (left).

Having the right tool and not being able to find it is the same as not having the right tool. A good tool box, chest or cabinet will make it easy to use tools properly as well as to keep the tools in better working condition.

blue-language city. If you need to hold a screw steady until it gets started, use pliers, not your fingers.

If a screw requires more twist to loosen than your palm can apply, grab the screwdriver shank with an adjustable wrench for more leverage.

Another abused basic automotive tool is the wrench. No matter what type of wrench you are using, the primary rule is in using the correct size for the bolt or nut. Remember, wrenches should fit snugly without being forced on. And they should be squarely on the nut or bolt, not twisted.

The next wrench rule is always pull, never push, the handle. You pull because, if the wrench slips off, or the part breaks, you will fall away from your work instead of into it. You also make doubly sure the area around your pulling hand is clear. Otherwise

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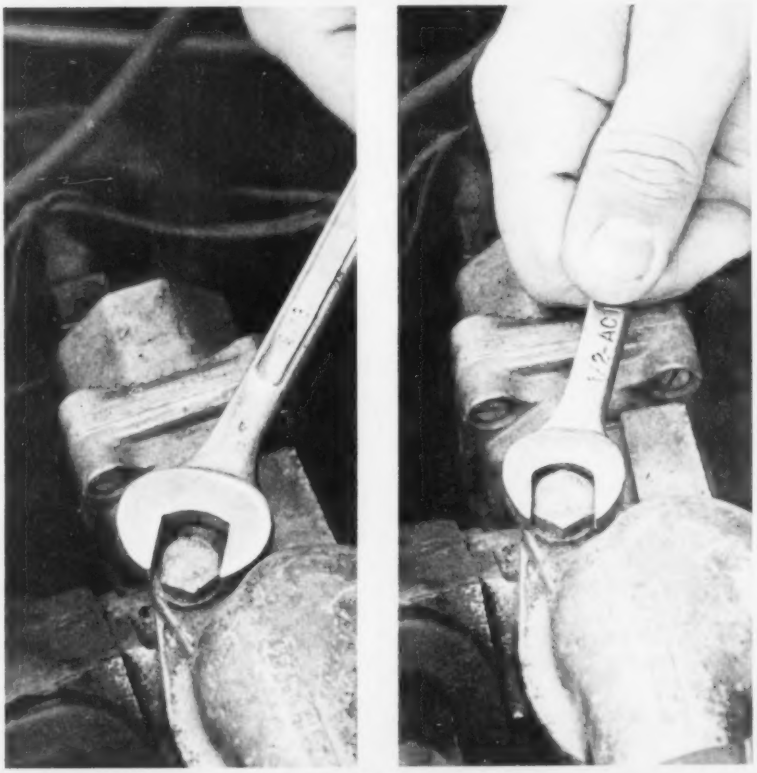
At that, it is also the most misused tool. The only proper use of a screwdriver is in turning screws. Installing and removing screws; what could be easier?

Well, don't look now, but the odds are the Back*ward* Mechanic is using a screwdriver as a chisel, pry bar, scraper or punch.

Don't laugh. You've probably done the same thing. It always seems easier to use a handy screwdriver than to look through the tool box for the proper instrument. Easier that is until something goes wrong (as it always does when using the wrong tool) and you ruin the object you're working on or your new slacks with the blood from your gouged body — or both.

Proper screwdriver use boils down to using the one with the blade that fits the screw slot as close as possible. The closer the blade fits the slot the more leverage you'll be able to apply. Using the wrong size blade will so badly damage the slot that no screwdriver will ever turn that screw again.

If you need to balance the screwdriver and screw, use your free hand to steady the screwdriver, not the screw. Hands must never be below the tip of the blade — one slip and it's



Wrenches should fit snugly without being forced (right). If the wrench slips, which is very likely with open-end models, the jaws can round the bolt's corners (left).

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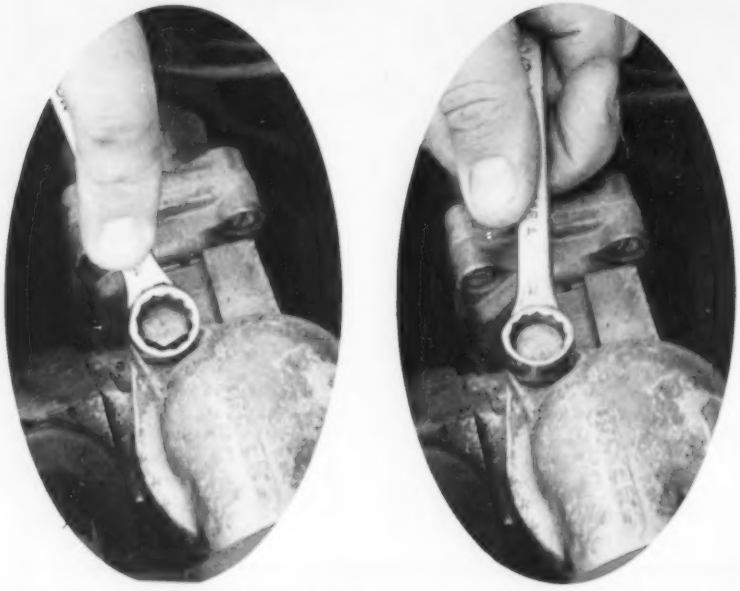

Always make sure the wrench head is flush with the work (above, right), not cocked (above, left). Even the best box-end wrench can slip off.

you might as well start smashing your hand into concrete right now to get used to the feeling. When pulling, pull toward the center of your body — there are going to be times when you'll need all your strength to budge a tight bolt.

Closed-end (box) wrenches are stronger than open-end ones, but are not as convenient to use. Because they completely surround the bolt head or nut, box wrenches are hard to get into tight spaces. Additionally, they have to be lifted off the head and repositioned several times for each bolt revolution in most situations.

On the other hand, open-end wrenches slip on and off nuts and bolts in addition to fitting into tight spaces. Yet, open-end wrenches have their problems, too. If the bolt is very tight, open-end wrenches can slip and round the head's corners. Once the corners are rounded, there is no way to grip the bolt.

When a bolt appears to be very snug, it should be treated with a solvent. Allow the solvent to soak in and work before making any attempt to move the bolt.

Of course applying more leverage makes the job easier. To do this, sockets with rachet or breaker bar handles come in handy. Proper-sized sockets give you all the strength of box wrenches while the ratchet handle provides the speed of the open-end variety. Drive extensions increase the reach of these tools. And the addition of U-joints or flexible extensions permit working around bends and into areas that you may not be able to see.

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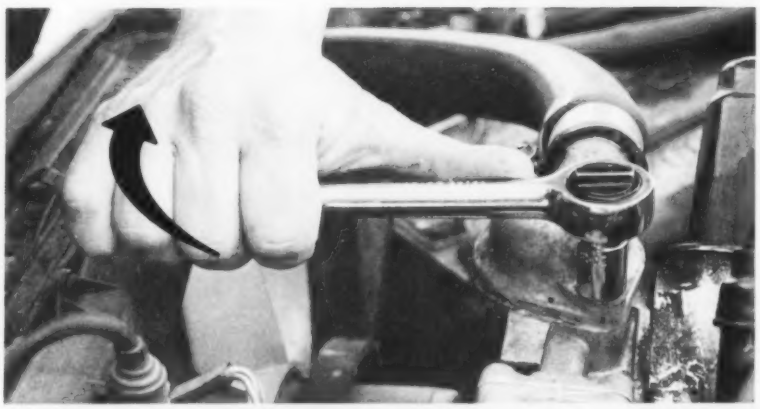
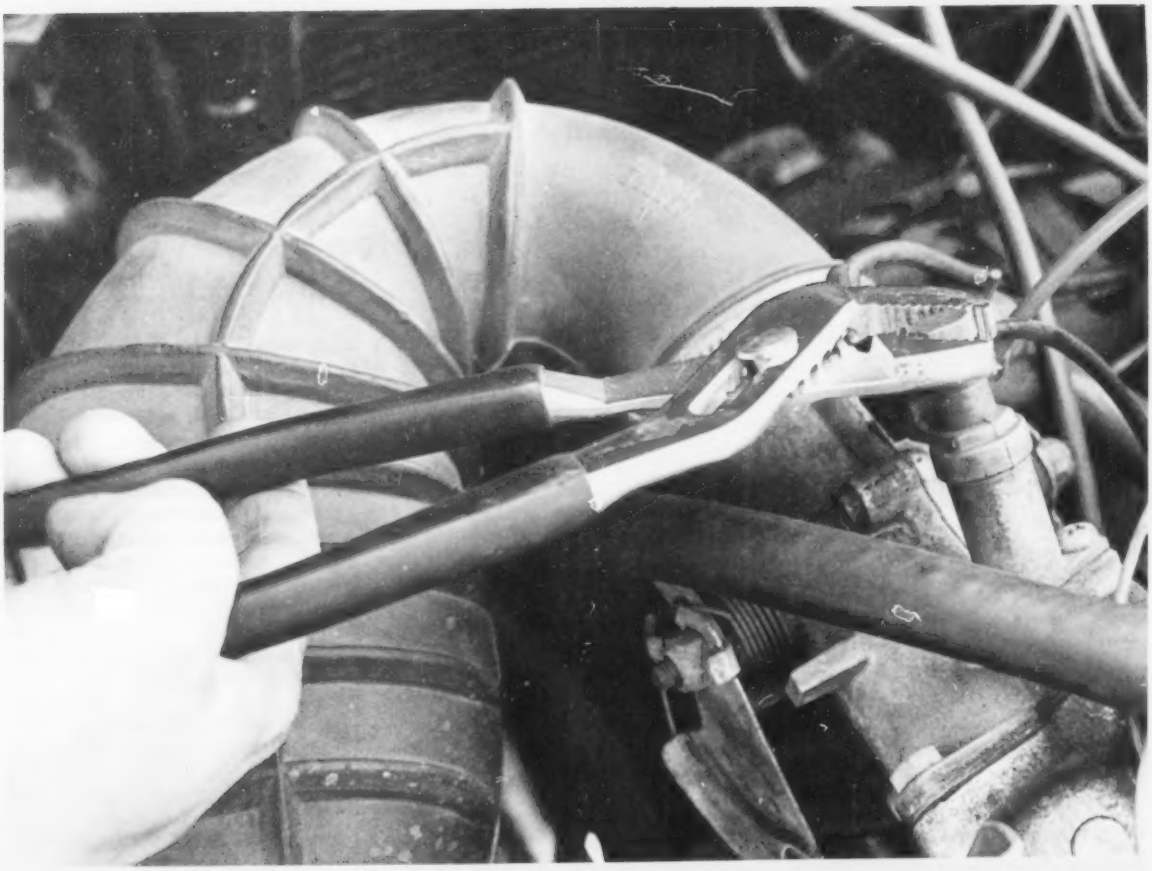


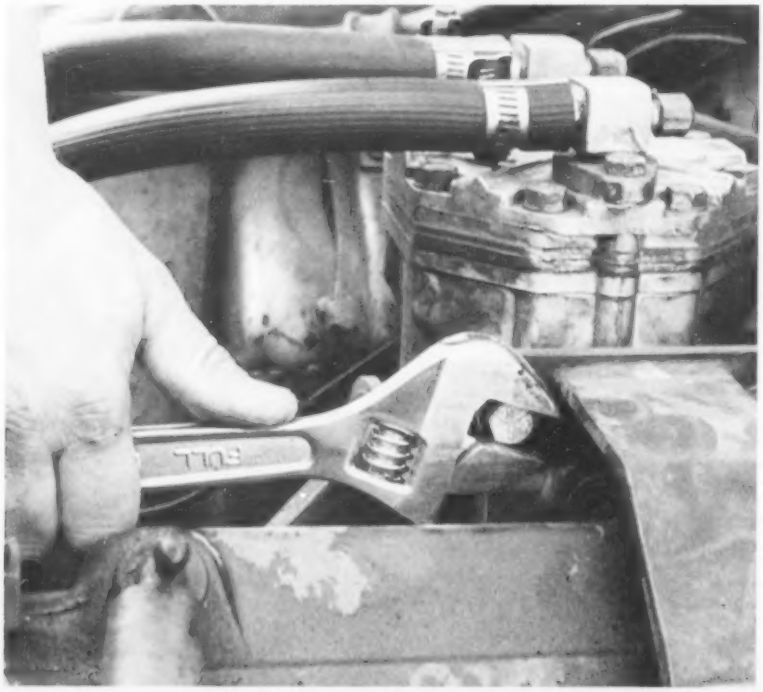
Wrenches are always pulled (above, left), never pushed (right).

To keep the socket firmly on the bolt, hold down on the ratchet head (right), not the extension or socket (left).



Pliers are not for turning nuts and bolts, they are for holding and cutting.

continued



When you have to use an adjustable wrench, pull on it so that the force is on the strong, solid jaw (top above), not the movable one (bottom above).

When pulling ratchet and breaker bar handles be sure to hold them firmly on the bolt or nut. Use your free hand on the head of the handle, not the socket or extension. This prevents the handles from flying off when pressure is applied.

Never use a pipe on a ratchet or short breaker bar to gain leverage. This type of force usually results in broken tools and damaged parts both on the vehicle and to the mechanic. If more leverage is required, get a larger breaker bar.

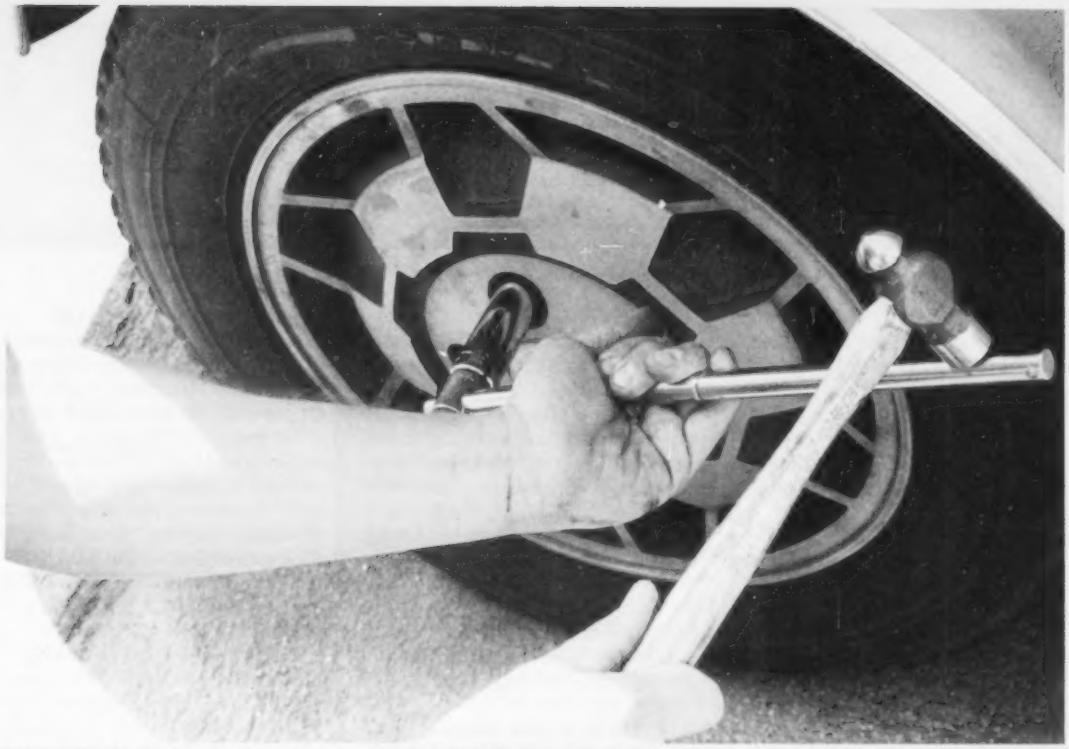
Because there will always be bolts and nuts that don't match the size wrenches and sockets that you have, every mechanic will have at least one adjustable wrench. And it will work just fine as long as it is properly adjusted to fit the head snuggly and the pulling action is against the fixed jaw, not the moving one.

Pliers are not wrenches. Don't use them for turning nuts and bolts. They are used for holding, cutting and squeezing things when your hands can't do the job.

That brings us to the Back*ward* Mechanic's favorite tool, the hammer. If a bigger hammer is the answer, you're asking the wrong question. Hammers are for driving parts, not forcing them. And because hammers do deliver a great deal of force to surfaces, always strike surfaces square to prevent chipping. Just in case, wear safety glasses whenever working with a hammer.

Using worn or damaged tools is just as bad as using the wrong tool or one of the incorrect size.

In conclusion, there is one rule that even the Back*ward* Mechanic always follows: If we planned on having them, they wouldn't be called "accidents." Always keep a first aid kit and fire extinguisher handy.



Hammering is not the answer for extra force, but it is an invitation to damaged parts and injury. If you need more force use a larger drive unit or soak the problem nut or bolt in a rust penetrant.

How to keep your crying towels handy

- Read the instructions first.
- Run gasoline engines only in areas that are well-ventilated — outside being the best.
- Keep hands, hair, loose clothing, jewelry and test leads away from moving parts.
- Don't touch hot exhaust manifold, radiator or high-voltage spark plug and coil terminals.
- Never look into a carburetor throat when an engine is being cranked or running. Backfires burn.
- Don't smoke or allow flame or spark to occur near carburetor, fuel line, fuel filter, fuel pump, spilled fuel, cleaning solvents and other flammables.
- Gasoline is NOT a solvent.
- Keep a fire extinguisher rated for gasoline and electrical fires in an easy to see and reach spot.
- Don't transfer gasoline or flammables from one container to another (including the gas tank) in closed areas.
- Don't store gasoline, solvents or other flammables near open flames (hot water heaters) or grinding equipment.
- Wear welder's gloves, hood, cap and long-sleeved shirt when welding.
- Wear safety goggles or glasses.
- Don't handle electrical equipment when you or the floor is wet.
- Never get under a vehicle that is not supported by at least two jack stands.
- Wear oil resistant and non-slip shoes.
- Don't attempt to lift heavy or bulky objects by yourself.
- Wear work gloves.
- "Cold" medicines, pain pills, uppers or downers do NOT mix with garage work.
- Keep toxic materials out of children's reach.
- Keep children away from all equipment except when under the direct supervision of responsible adults.
- Don't stand in front of or behind a running car. Also stay clear of the path a broken fan might take.
- Set the emergency brake, put the transmission in neutral or park, and block the wheels.
- THINK SAFETY!

LETTERS to the EDITOR — BACKFIRE

WHO SHOULD YIELD

In reference to "Timely Topics" in the December 1980 issue, I'm going to take issue with you on the "right of way" question. As a 15-year police veteran, I've seen, assisted at, and investigated thousands of accidents. This is from the first call to a followup at the autopsy.

It is my belief you should state that *NO ONE has the right of way*. The law merely states who shall yield to whom. This will vary, generally, in exact wording by state. If you approach an intersection thinking you have the right-of-way, a police officer might someday have to notify your wife and 5-year-old on Christmas Eve that "Daddy" won't be home any more; Daddy was right, and now she can sign a summons against the transgressor. Safety is a state of mind, not a law.

Mr. Joel E. Gross
Driver Training Specialist
Agway Inc. — Training Center
East Syracuse, NY 13057

A better title for our brief discussion would have been "Who Should Yield." Even in very clear-cut cases, such as an intersection where one has a green light, the driver is obliged to insure that it is safe to take the right of way.

PREMIUM GASOLINE

In response to your December 1980 Double Tech, I have a couple of comments about the high-compression premium fuel problem. First, don't sell a classic car just because you don't get premium fuel. A trick many of us are unaware of is that mixing unleaded fuel and regular fuel can yield an octane higher than the octane of either the unleaded or regular. This is true because unleaded fuel has high octane additives but has a low octane because it has no lead and the leaded regular has few high octane additives. Mix them 50/50 or to about 80% unleaded and 20% leaded and you will have a sort of leaded premium with up to 95 octane. Second, high-compression engines are more efficient than our late model smoggers. To boost their economy, some changes in gear ratios and camshafts can make a huge difference. Don't dump your muscle car classic — just tame it and preserve it.

I have a '55 Chev Nomad with a high compression 327 that gets almost the same highway mileage as my late model smogger compact. Keep up the good magazine.

1Lt Charles E. Hillman, USAF
Loring AFB, ME 04751

Having read the December 1980 issue of your fine magazine, I thought I would respond to the question sent in asking about premium gasoline for high-compression engines. Your recommended solutions of buying aviation fuel and/or adding octane boosters work well, but they are a hassle. I have found that using a mixture of 75% unleaded premium (about 93 octane) to 25% regular leaded produces an approximate 95 octane (R+M) leaded premium. This mixture works sufficiently for engines with compression ratios up to about 10.5 to one. For engines with still higher compression ratios, a combination of water injection, octane boosters, and timing retardation works well for street use. The above information works well for me, and I hope some of your readers can benefit from it in these times of poor-quality gasoline.

Lt Nico Over, USN
NAS Norfolk, VA 23511

Mixing unleaded with leaded is a sound idea, as was pointed out in the February Double Tech.

MOTORCYCLE DRIVE CHAIN

While reading the interesting articles in your February 1981 issue, I was particularly interested in your article on motorcycle drive chain care.

On page 26 of the article, it referred to the proper way to tighten the axle nut by pulling forward on the wrench, thus preventing the axle from accidentally shifting, producing misalignment. One might add that this task can be made easier by first removing the cotter pin from the nut before trying to tighten it.

I applaud your interest for the motorcyclist's safety, having ridden a bike for three years now myself. Please continue your efforts to make more people more aware that we are out there, and to watch for us.

SSgt Dennis C. Brock, Jr., USAF
McClellan AFB, CA 95652

As a naval officer and staff safety advisor, I look forward with relish to reading your superior publication each month. However, I noted a slight discrepancy in your February 1981 issue which I must bring to your attention.

On page 26 you depict the "proper" way to tighten a motorcycle axle nut. However, the choice of a box-end or open-end wrench would be far superior to the crescent wrench in the photograph. It is even more interesting to note that in the picture a cotter pin is already installed. Since when is one installed before the nut has been tightened?

Despite this slight oversight, I look forward to future issues. Keep up the excellent work.

LCDR Peter S. Blackwood, USN
NAS Jacksonville, FL 32212

You caught us taking "one last picture" after the job was done. As for the adjustable wrench, we're like most backyard mechanics and don't always have the size wrench we need

for the job so we have to use a monkey wrench – see "April Tools" in this issue.

AUTOMOTIVE FIRE SAFETY

Recently my family and I experienced a near-disaster. It is my hope that by telling you about it you may learn from my mistakes and the same thing won't happen to you.

As my wife returned from a shopping trip and pulled into the carport, smoke began to billow out from under the hood of the car. She shut the engine off, got herself and our daughter out of the car, and ran to the neighbor's house for help. It was to our good fortune that our neighbor was home and had a fire extinguisher. He was able to put the fire out while the fire department was still on the way.

The Fire Chief said that, given the time needed for them to respond and the nature of that type of fire, we could have lost not only the car but our house as well. The only thing that prevented such a terrible loss was the quick action of my neighbor and the fact that he owned a fire extinguisher.

The fire was caused by a broken fuel line. The fuel line was the rubber hose type and had deteriorated with time. So, these are the lessons I learned, and I hope you will also learn from my experience:

(1) Buy yourself some UL-approved A.B.C. fire extinguishers. One for each of your vehicles and one for your home. Teach yourself and your family members how to use them. Any good fire extinguisher comes with complete instructions and the fire department will be glad to advise you. Use the extinguisher on a mock fire to get the feel of it. The fire department will then recharge it for you at no cost. Then store each extinguisher in an accessible location. Don't lock it in your trunk.

(2) Inspect the fuel line of your vehicle. If it is the rubber hose type, consider having it replaced with a metal pipe. The Fire Chief told me that he has seen numerous vehicle fires caused by broken rubber fuel lines. He said it usually happens when the rubber tube is about two years old.

(3) If you do have a fire in your engine compartment, the first consideration should be to get everyone to safety and notify the fire department. Then, if you have an extinguisher, proceed with extreme caution. Opening the hood can cause the fire to literally explode in your face. Release the hood latch, then carefully raise the hood just far enough to direct the extinguisher onto the engine.

About the only thing I did right was to have a good insurance policy. The repairs to my car will cost several hundred dollars but my cost is limited to the $50 deductible on my comprehensive coverage. You can bet that, when my car is repaired, it will have a metal fuel line. You can also bet that each of my vehicles will very soon be equipped with fire extinguishers and there will be one in my house. Who says you can't teach an old dog new tricks?

SMSgt Terry S. Bowman, USAF
Cannon AFB, NM 88101

FLASH

You must have the fastest photographer around. In the March issue he appears in almost all of the photographs. How does he do it?

A faithful reader
San Antonio, TX

Clifford Munkacsy is a man of many, many talents in front of and behind the camera, as we pointed out in the March 1981 DRIVER. Those of you with a good eye will also remember his starring as Inspector Jacques Bouseau in "Preventing Theft," December 1980 DRIVER. But, in "The Adventure of the Damp Street" his role was in front of the camera only, the tech editor shot the pix.

TO PROVE MACHISMO?

I just read your December 1980 issue. In regard to the "Timely Topics" note on the disparity in accident rates between female and male drivers, perhaps you answered your own question — the need to prove machismo is generated by the existence of females. Thus, females are responsible for the higher accident rate of males.

Maj J. Jeremiah Mahoney, USAF
Woodbridge, VA 22192

HOW MUCH LEAD?

In the February 1981 DRIVER you recommended pumping in eight gallons of unleaded with two gallons of leaded regular gasoline to raise octane. However, a February addition of the *Los Angeles Times* said that engineers at the Automobile Club of Southern California recommend mixing a half tank of leaded regular with a half tank of unleaded premium gasoline to get fuel about 93 octane. What gives?

Mr. Richard Smartt
Hill AFB, UT 84056

We've heard about ratios ranging from 15 to 50 percent from more sources than we care to remember. According to petroleum engineers, ratios from the 15 to 20 percent that DRIVER recommended to 50 percent all produce about the same results. For the DRIVER staff, the bottom line is the amount of lead being cycled through the engine, so we recommend the lowest percentage of lead possible.

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The rain
is a pain
because it falls
mainly in the lane
with the least
amount of drain
causing all drivers
to complain
and cars to hydroplane